

9. *The Smallest Titanosuchid yet recovered from the Karroo.* By L. D. BOONSTRA, D.Sc.

(With Plate XVIII and 5 text-figures)

In the collection of the South African Museum there is a specimen (S.A.M. 4323) collected by Houghton on the Merweville Commonage in 1917. This had been entered in the register as a Gorgonopsian, presumably because of its small size. The specimen as preserved consists of the anterior third of a small skull, the major part of a manus, a tarsus, a nearly complete femur, a radius, a fibula, part of the head of the humerus, a coracoid, a series of caudal vertebrae and some other fragments. This is the first specimen of a South African Deinocephalian in which most of the bones of the fore- and hindfoot have been found in articulation.

THE SKULL (fig. 1)

In the accompanying figure the lateral aspect of the snout is given, with the missing part of the skull indicated by broken lines. The snout is very similar in general build to that known in the large *Anteosaurus*, although in size it is less than $\frac{1}{3}$ of *Anteosaurus abeli*. The nostril is not terminal; the alveolar border, anterior to the canine, sweeps sharply upwards; this reduction of the premaxilla creates the space necessary for the large anteriorly directed anterior incisors, whose function has become that of snatching, piercing and tearing teeth (cf. mechanical grab); the five upper incisors, increasing rapidly

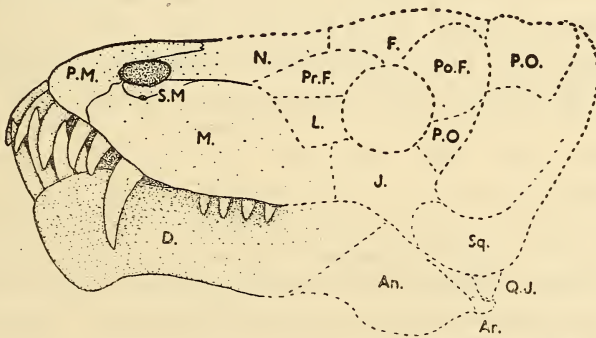


FIG. 1.—*Micranteosaurus parvus* Gen. et Sp. Nov. Lateral view of anterior third of the skull with the missing posterior two thirds in broken lines based on the structure of *Anteosaurus*. S.A.M. 4323. Commonage, Merweville, Beaufort West District. ($\times \frac{1}{3}$.)

in size from number 5 to number 1, intermesh with the four incisors of the dentary; the lower incisors also increase rapidly in size from number 4 to number 1, but they are directed upwards and very much less anteriorly than are the upper incisors; the posterior border of the incisors forms a sharp cutting edge with fairly fine serrations; the upper incisors occupy 55 mm. on the left and 57 mm. on the right side (measured over the curve).

Between the last incisor and the canine there is a diastema of 5 mm. on the left and 4 mm. on the right side. The canine is a strong curved tooth with a length of 35 mm. and at the base of the crown the antero-posterior diameter is 14 mm.; its posterior edge, though sharp, is not serrated.

Between the canine and the first postcanine there is a diastema of 27 mm. on the left and 23 mm. on the right side; on the right the first and second postcanines are in part preserved, whereas on the left the first, third and fourth are in part preserved; the postcanines are small stubby teeth apparently irregularly spaced and functionally unimportant.

The dentary is strong with the alveolar border housing the incisors bent downwards to increase the space necessary for the very long anterior incisors; the symphysis is strong; the mentum squarish with ventrally a "gonial" or "digastric" tubercle.

The premaxilla extends some distance posteriorly between the nasals. The limits of the septomaxilla are not very clear, but the bone is small and apparently forms the ventral border of the nostril as shown in the figure. The maxilla is not swollen above the canine so that it would appear that the root of the canine is not strong. Anteriorly the maxilla has a large overlap over the premaxilla.

FEMUR (fig. 2a)

Except for its distal end the femur is fairly well preserved. It is a long slender bone with both its proximal and distal end unexpanded and the shaft long and slender. A twist in the shaft places the distal end at right angles to the proximal end. The proximal facet is directed appreciably anteriorly. No external trochanter is differentiated on the posterior edge of the bone and the area for the insertion of the ilio-femoralis is narrow. Anteriorly a ridge separates this area from the area for the insertion of the pubo-ischio-femoralis internus. The posterior condyle has no epicondylar widening and the facet for the fibula is terminal. The intercondylar fossa is shallow and so is the popliteal fossa. The intertrochanteric fossa is shallow, and with no clearly differentiated external and internal trochanters developed, it is not clearly demarcated either anteriorly or posteriorly. There is thus little left of the primitive Y ridges.

It is thus evident that this femur differs greatly from that hitherto described in any South African Deinocephalian where the bone is usually a short stout

element with short wide shaft and greatly expanded distal and proximal ends. Although superficially resembling the femur of Therocephalians and Gorgonopsians, it differs strikingly in the absence of a differentiated external trochanter and in the rotation of the ends on the shaft.

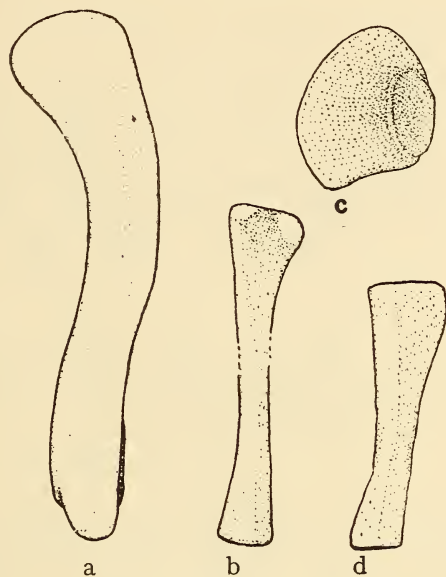


FIG. 2.—*Micranteosaurus parvus* Gen. et Sp. Nov. S.A.M. 4323, Commonage, Merweville, Beaufort West District. *a*, Dorsal view of left femur. ($\times \frac{1}{3}$.) *b*, Ventral view of fibula. ($\times \frac{1}{3}$.) *c*, Dorsal view of left coracoid. ($\times \frac{1}{3}$.) *d*, Dorsal view of radius. ($\times \frac{1}{3}$.)

FIBULA (fig. 2*b*)

The fibula is a lightly built long and slender bone with its proximal end strongly expanded and with its articulating facet for the femur terminal. Whereas the proximal end is flattened, the distal facet is broadly oval in outline.

PES. (plate XVIII*a* and fig. 3)

When this specimen came under my notice it had already been partly cleared of matrix and the parts glued together. Before preparing it further I embedded the whole in plaster. In the accompanying plate I give a photograph of the pes after preparation and still in the plaster bed. From this it is evident that the two proximal tarsals joined by matrix were rotated as a unit through 180° when joined by glue to the distal part of the pes in

the original preparation. In Fig. 3 the proximal tarsal elements are shown right side up.

The intermedium is an ovoid bone with its outer border concave and facing a similar concavity of the fibulare, thus creating a passage for an artery.

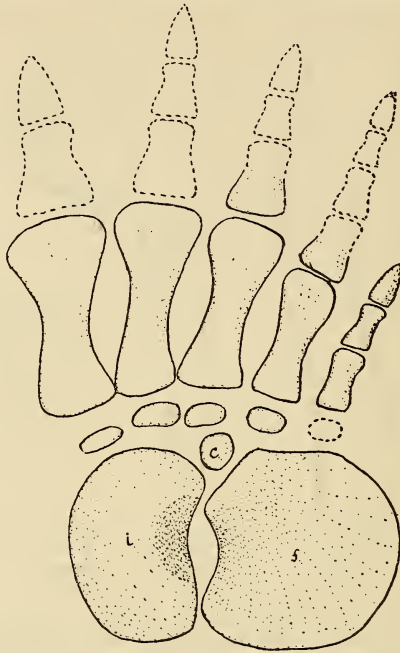


FIG. 3.—*Micranteosaurus parvus*
Gen. et Sp. Nov. S.A.M. 4323,
Commonage, Merweville, Beaufort
West District. Semi-diagrammatic
restoration of the right pes seen in
dorsal view \times about $\frac{3}{4}$. C—
centrale; F—fibulare; I—inter-
medium.

The fibulare is a dorso-ventrally flattened bone, but thickened both proximally and distally to form articulating facets for the fibula and centrale and 4th distale respectively.

The single centrale is a small pebble-like bone.

Four distalia are preserved, but a fifth must also have been present.

Five metacarpals are preserved as shown in the illustrations; they are dorso-ventrally flattened bones, constricted in the waist and with their distal ends more expanded than the proximal ends. No. 1 differs but little from No. 2, but the 4th and especially the 5th are much reduced.

Phalanges. In the first two digits no phalanges are preserved, and in the 3rd and 4th only the proximal end of the first phalanges are present; in the little toe there is a fairly long phalanx and an unguis phalanx preserved.

The tarsal formula is thus 2, 1, 5, and the phalangeal formula 2?, 3?, 3?, 4?, 2.

The pes is thus still closely related to that of the Pelycosaurians.

CORACOID (fig. 2c)

The left coracoid is preserved. It is roughly circular in outline; thickened laterally where it carries an articular facet to form the lower part of the glenoid articulation; medially it forms a fairly thin sheet of bone with a concave upper and a convex under surface. Anteriorly it has a free edge and is not suturally united to the procoracoid, as is the case in most Therapsids including the Deinocephalians such as *Jonkeria* and *Moschops*. This free coracoid is, however, encountered in a number of Deinocephalians, e.g. *Struthiocephalus*, *Tapinocephalus*, *Pelosuchus*, etc.

RADIUS (fig. 2d)

The radius is much shorter than the fibula. It is a fairly slender bone somewhat flattened dorso-ventrally; its proximal end is expanded to about twice the width of the distal end, but the shaft has no waist-like constriction.

MANUS (plate XVIIIb and fig. 4)

When the manus came to my notice it had also been partially prepared, but all the constituent bones were still joined to each other by matrix. I also embedded the whole in a block of plaster before continuing the preparation. As is evident from the photograph, the first digit lies extended, the second and third folded inwards, in the fourth digit the phalanges have been displaced and the fifth lies extended. In the proximal row of the tarsus the intermedium and ulnare have been displaced medially (anteriorly).

In Fig. 4 I give a restoration of the dorsal aspect of the manus. In the proximal row of the carpus there are a radiale, intermedium and ulnare. The radiale is roughly rectangular in outline; dorso-ventrally compressed; it is thickened distally and proximally to form facets for the distals (1 & 2) and radius respectively, with both the dorsal and ventral surfaces concave antero-posteriorly. The intermedium is a fairly small thin flat bone.

The ulnare is the longest bone of the proximal row. It is a stout bone, proximally thick and knob-like, with a large convex proximal facet for the ulna; anteriorly it is weaker, with a flat distal articular facet for the distals (4 and 5); just behind the distal face the bone has a constricted waist.

The centrale is not preserved, but was probably a fair sized bone lying anterior to the intermedium and between the distal ends of the radiale and ulnare, articulating distally with two distals (2 and 3).

There are 5 distal carpals. The first is a small pebble-like bone; the second is the largest of the distals, its dorsal surface is excavated with ridges

on the preaxial, distal and proximal edges; the third also has an excavated dorsal surface; the fourth and fifth are pebble-like.

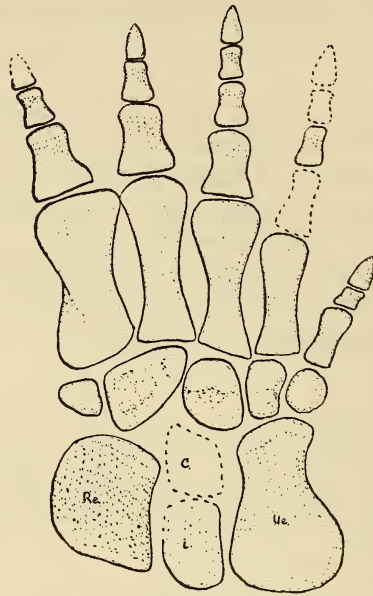


FIG. 4.—*Micranteosaurus parvus*
Gen. et Sp. Nov. S.A.M. 4323,
Commonage, Merweville, Beaufort
West District. Semi-diagrammatic
restoration of right manus seen in
dorsal view \times plus-minus $\frac{1}{2}$. C.—
centrale; I—intermedium; Re—
radiale; Ue—ulnare.

As a whole the carpus is very Pelycosaur-like, approaching that of *Ophiacodon* fairly closely, except that there is only one centrale.

The metacarpals are somewhat dorso-ventrally flattened bones in general rod-like with slightly constricted waists; the decrease in size from the first to the fourth is fairly evenly graded, but the fifth is much reduced; the first metacarpal is distinguished by being much broader than the others and thus relatively more flattened with expanded ends.

In the first digit the first phalanx is broad proximally, with a waist situated in the anterior half; the distal end is much narrower than the proximal; the second phalanx is much smaller, also broader proximally than distally, with the waist nearly in the middle; anterior to the second roughly hourglass-shaped phalanx there is preserved the proximal end of the unguis phalanx, so that in the first digit there are 3 segments. This is most unusual, but there is no doubt that such is the case. Even without the preserved proximal end of the unguis phalanx the count would also be 3, for the second phalanx with its hourglass-shape could not possibly be an unguis phalanx.

In the second digit there are also 3 segments with each of the constituent phalanges closely resembling those of the first digit.

The third digit has four segments.

The phalanges of the fourth digit have been displaced and all but one lost. What I believe to be the second phalanx lies above the displaced fourth metacarpal. The fourth digit probably had 4 segments as is the case in the third digit.

The fifth digit is much reduced with a short hourglass-shaped first phalanx and a fairly high, narrow and long unguis phalanx.

The carpal formula is thus 3, 1, 5, and the phalangeal formula 3, 3, 4, 4?, 2, and in structure thus near that of the Pelycosaurus.

A MOSCHOPID CARPUS (fig. 5)

For comparison I am including here a figure of a carpus, which, on the humerus, I have identified as a Moschopid fairly near *Moschops*. This specimen, S.A.M. 9157, collected by me at Wolwefontein, Prince Albert, consists of a good humerus, radius and ulna, with elements of the carpus still joined by matrix to the distal end of the epipodial in natural articulation.

In the proximal row there are four bones, viz. radiale, intermedium, ulnare and pisiforme. Only the proximal part of the radiale is preserved, but it would appear that the complete bone was a strong rounded element. The intermedium is nearly circular in outline, with its dorso-ventral diameter about equal to the antero-posterior diameter, and it is thus not a thin plate-like bone. The ulnare is a large bone, subcircular in outline; a longitudinal ridge divides its dorsal surface into two faces, of which the postaxial one is the larger; it is a much thinner bone than the radiale and intermedium, and its under surface is deeply concave.

Postaxially there lies a pebble-like pisiforme.

In between the ulnare and the radiale there was a fair sized centrale; the actual bone has been lost, but an impression in the matrix on the preaxial surface of the ulnare indicates its position. None of the five distals is preserved.

This Moschopid carpus is thus structurally close to that of the Pelycosaurus, but the shape of the individual bones is quite different, whereas in *Micranteosaurus* the individual bones very closely resemble those of the Pelycosaurus in shape.

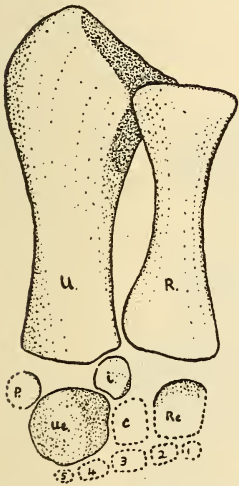


FIG. 5.—An undetermined Moschopid. S.A.M. 9157, Wolwefontein, Prince Albert District. Part of right fore-limb $\times \frac{1}{6}$. C—centrale; I—intermedium; P—pisiforme; R—radius; Re—radiale; U—ulna; Ue—ulnare.

TAXONOMIC

Although we know nothing about the posterior two thirds of the skull, the snout is sufficiently characteristic to enable us to establish its affinities. The dorsally curving alveolar border of the premaxilla, the long simple intermeshing incisors, the short postcanine series; the fairly narrow, high snout, and the position of the nostril show that this small Titanosuchid is structurally nearly akin to the large *Anteosaurus*. Because of this great difference in size I propose that it be considered a new genus, under the name *Micranteosaurus parvus* Gen. et Sp. Nov. With *Anteosaurus* it is to be included in the Titanosuchid family Anteosauridae.

PLATE XVIII. *Micranteosaurus parvus* Gen. et Sp. Nov. S.A.M. 4323, Commonage, Merweville, Beaufort West District. *a*, Pes. The proximal segment shows the ventral surface of the intermedium and fibulare as these two bones have been turned upside-down in the original preparation. This error is corrected in the restoration (Fig. 3) \times about $\frac{2}{3}$ nat. size. *b*, Manus in dorsal view \times about $\frac{1}{3}$, nat. size.